Yacovone, Krista

From: Thorn, Paul <PThorn@Brwncald.com>
Sent: Tuesday, August 06, 2013 9:57 AM
To: Gorin, Jonathan; John M. Hoffman
Cc: Carrie McGowan
Subject: RE: Tomorrow's call
Attachments: Resid-Organic_Sat_Soils-LCP(080513).pdf

Jon,

I've attached a breakdown of the concerns raised regarding free product, and how it's been addressed throughout the RI and subsequent documents. If you'd like to call to discuss, I can be reached at (201)574-4754.

1:00 pm would be a good time to call if you have any further questions.

Thanks,
Paul

Paul Thorn
Brown and Caldwell | Upper Saddle River, NJ
PThorn@brwncald.com
T 201.574.4754 | **C** 201.803.1869

From: Gorin, Jonathan [mailto:Gorin.Jonathan@epa.gov]
Sent: Tuesday, August 06, 2013 9:33 AM
To: John M. Hoffman
Cc: Carrie McGowan; Thorn, Paul
Subject: RE: Tomorrow's call

Ok, great. Paul, I'll also need your number and a time to call. It won't take long.

On a related matter. I expect the final NRRB memo this week (my response is already drafted). I also expect HQ's comments on the proposed plan this or next week. Once those are approved and out of the way, it's only the RI/FS/BERA final submittal/approval and we're good.

It's going to be close….

From: John M. Hoffman [mailto:jmhoffman@ashland.com]
Sent: Tuesday, August 06, 2013 9:28 AM
To: Gorin, Jonathan
Cc: Carrie McGowan; PThorn@Brwncald.com
Subject: Re: Tomorrow's call

Jon,
Yes it would. Paul also will sending a summary of the issue to you today.
Scott will also be calling on tomorrow.

Thanks
John

John Hoffman
Project Manager - Remediation
302 995-3233

Ashland Inc.
Environmental Health Safety & Product Regulatory
500 Hercules Road
Wilmington, DE 19808-1599

M: 302 668-7259
F: 302 995-3485

ashland.com

From: "Gorin, Jonathan" <Gorin.Jonathan@epa.gov>
To: John M. Hoffman/RCWilm/NA/Herc@Ashland, Carrie McGowan <Carrie.McGowan@ehs-support.com>, "PThorn@Brwncald.com" <PThorn@Brwncald.com>,
Date: 08/06/2013 09:18 AM
Subject: Tomorrow's call

John, would it be all right for me to chat with Paul this afternoon about tomorrow's call?

jon
- -

Agency Comment

Jon Gorin stated in an e-mail dated July 25, 2013 that a comment was submitted by NJDEP to the National Remedy Review Board (NRRB) prior to its meeting about the LCP site on June 26, 2013, as follows:

> 'Free liquids- organics' was identified in a number of soil borings during the remedial investigation (August, 2002 Site Characterization Report) however was not addressed in the remedy. Consistent with the regulations listed above, LCP shall treat or remove free organic product and residual product to the extent practicable, or contain free product and residual product when treatment or removal is not practicable.

Response

1. 2002 Site Characterization Summary Report has been superseded

The August 2002 Site Characterization [Summary] Report provided a brief, initial presentation of information obtained during the Phase I RI field investigation. This documented was superseded by the "Phase II Site Characterization Summary Report", (Brown and Caldwell, September 2007) which was ultimately superseded by the "Draft Remedial Investigation Report", (Brown and Caldwell, September 2008). As a result, the (Phase I) Site Characterization Report should no longer be relied on for site conditions related to site remediation.

2. Agency concerns about the Organic Liquids were addressed in the Phase II RI field investigation

Collection of data related to soil and groundwater characterization during the Phase II RI field program was performed in accordance with the document titled, Addendum No. 1, (Soil and Groundwater) Work Plan: Phase II Remedial Investigation ", (Brown and Caldwell, April 2006). This Work Plan included the collection of soil and groundwater data to explicitly address the findings in the Phase I Site Characterization Report as was described in the following correspondences which are attached:

- Letter from EPA, dated March 12, 2003, commenting on the Phase I SCR, (Comments No. 24 and 25 refer to drilling locations to address the aforementioned issue).
- Letter from EPA, February 6, 2006, commenting on the Draft Phase II RI Work Plan, (Comment No. 6 refers to drilling locations to address the aforementioned issue).

3. Nomenclature regarding non-aqueous phase liquids has been modified

The Phase I Site Characterization Summary Report (Brown and Caldwell, August 2002) uses the term "Free liquids – organics" to describe what is now characterized as "residual saturation of unidentified organic liquid". The current terminology would be consistent with what is termed "Residual Product" in N.J.A.C. 7:26E-1.8 (see No. 5). This change in terminology is based on a better understanding of site conditions and also a better adherence to the New Jersey definitions of "Free Product" and "Residual Product" per N.J.A.C. 7:26E.

4. Remedial Investigation Report concludes that non-aqueous phase liquids are present as residual saturation in subsurface soils

Information was presented in the Draft RI Report (Brown and Caldwell, September 2008) regarding the character of non-aqueous phase liquids observed in the subsurface during the Phase I and Phase II RI. Specifically, this is described as residual saturation of organic liquids.

Tabular Information

- **Table 6-15** - Soil Samples Containing Residual Saturation of Unidentified Organic Liquid
- **Tables 6-2 a, b, c, d** – Soil Results Exceeding Direct Contact Soil Remediation Standards
- **Appendix J** - Tabular Summary of Analytical Data

Draft Remedial Investigation Text

- **Section 6.1.8 Residual Organic Saturation *(in Soil)*:**

  Visual identification of possible residual saturation of unidentified organic liquids were made in a number of soil samples, as listed on Table 6-15, as were generally characterized by the presence of oily material smudge. This material is not widely distributed across the site. The soil laboratory analysis data yields no additional information regarding this material. In addition, no free phase liquids were observed in monitoring wells.

- **Section 6.4.3 Organics *(in Groundwater)*:**

  No free phase liquids were observed in the groundwater column in either overburden or bedrock monitoring wells.

5. Additional Evaluation of RI Data

A further evaluation of available data obtained during the Phase I and Phase II RI field investigation to present additional evidence that the observations of non-aqueous phase liquids in the subsurface soil sample meet the definition of "Residual Product" per N.J.A.C. 7:26E-1.8.

Detailed Field Descriptions of Soil Samples

- **Available Information:** Detailed field observations were made of the soil samples collected during the Phase I and Phase II RI by a field geologist. These included a visual grain size determination, field screening with a PID and MVA, and visual observation of the potential presence of elemental mercury and non-aqueous phase liquids. These detailed observations were and recorded in a bound field logbook. The raw field descriptions provide somewhat more detail than the summary descriptions provided on the boring logs. These records have been retrieved and reviewed.
- **Conclusions:** The observations of field non-aqueous phase liquid in the soil samples referenced on Table 6-15 are typically described as small blebs, grain coatings, staining, sheen on water within the split tube soil sampler, organic odor, petroleum-like odor, creosote-like odor. These descriptions are consistent with the definition of material that is below the residual saturation point, that is, "residual product".

Sample Distribution

- **Available Information:** The areal distribution and depth of the samples containing observed residual saturation of organic liquids (also referenced on Table 6-15) are shown on the attached Figure.
- **Conclusions:**

- The locations of the samples containing observed residual saturation of organic liquids are grouped in several areas of the site. These areas include the so-called “Ditch Bridge” area located in the north-central portion of the site, along the east and south sides of the former production area, and in proximity to the railroad tracks within the southern point of the property. While there are these groupings, there are numerous other soil borings in the same areas in which non-aqueous phase liquids were not observed. Therefore, the relatively discontinuous areal distribution of these samples is inconsistent with a laterally continuous layer of non-aqueous phase liquids.
- The depths of the soil samples listed on Table 6-15 typically range from 4 to 11 feet below ground surface within the anthropogenic fill which in nearly all cases is below the water table. Furthermore, one referenced sample was collected at a depth of 26 to 28 feet within the glacial till. The observed depths of the samples are inconsistent with the presence of a floating layer of “free product”.

Laboratory Analyses

- **Available Information:** Laboratory analyses were performed on various soil samples in which residual saturation of organic liquids were visually identified, referenced on Table 6-15. The analyses included the Target Compound List (TCL) organic compounds plus tentatively identified compounds (TICs) and the Target Analyte List (TAL) inorganic constituents. A summary table has been prepared of the analytical results for these samples that list constituents exceeding the NJ Soil Remediation Standards and also the detected VOC TICs.
- **Conclusions:** The aforementioned laboratory data does not reveal information consistent with highly elevated concentrations of constituents that would be manifested as a non-aqueous phase liquid. Specifically, the analytical results are similar to other samples collected throughout the anthropogenic fill at the site and do not contain levels of constituents frequently found in petroleum products or other materials that are elevated in comparison to other soil samples at the site.

Well Observations

- **Available Information:** Measurements made in monitoring wells at the site reveal an absence of non-aqueous phase liquids either as a floating (light) layer or at the bottom of the wells (dense).
- Conclusions: The findings of no non-aqueous phase liquids in monitoring wells supports the lack of a “free-product” or mobile non-aqueous phase liquids in the subsurface.

6. Tech Rule Definitions - N.J.A.C. 7:26E-1.8

"Free product" means a separate phase material, present at a concentration greater than a contaminant's residual saturation point, as determined pursuant to the methodologies described in N.J.A.C. 7:26E-2.1(a)14. This definition applies to solids, liquids, and semi-solids.

"Residual product" means a separate phase material present in concentrations below a contaminant's residual saturation point, retained in soil or geologic matrix pore spaces or fractures by capillary forces, as determined pursuant to the methodologies described in N.J.A.C. 7:26E-2.1(a)14. This definition applies to solids, liquids, and semi-solids.

"Residual saturation point" means the saturation point below which non-aqueous phase liquid becomes discontinuous and is immobilized by capillary forces, and fluid drainage will not occur.

N.J.A.C. 7:26E-2.1(a)

14. Determine if either free product or residual product is present in any environmental media using direct observation, enhanced field observation methods, field instrumentation measurements, or laboratory analytical data;

i. For contaminants that are in their pure phase and are at standard state conditions (20 degrees Celsius to 25 degrees Celsius and one atmosphere pressure), and that have densities greater than water, free or residual product shall be considered to be present if the contaminant is detected in ground water at concentrations equal to or greater than one percent of the water solubility of the contaminant if ground water contains only that organic contaminant; or

ii. If a mixture of such contaminants is present, then the effective water solubility of the contaminant shall be estimated for this determination; and

Conclusion

The 2002 Site Characterization Summary Report utilized the term free organic – "Free Liquids – Organics" to describe an observed residual saturation of unidentified organic liquids. These observations were further investigated during Phase II activities. The results of additional investigation have concluded that the material observed initially as free liquids does not meet the definition of "Free Product" as defined in N.J.A.C. 7:26E, and are more consistent with the term "Residual Product". These findings have been documented in the Remedial Investigation Report in section 6.1.8, Tables 6-2a through 6-2d, Table 6-15, and Appendix J. We have provided the attached information to further support this conclusion.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
290 BROADWAY
NEW YORK, NEW YORK 10007

MAR 12

Federal Express

Carrie McGowan, Program Manager
ISP Environmental Services, Inc.
1361 Alps Road, Bldg. 8-3
Wayne, New Jersey 07470

RE: Comments on the *Site Characterization Summary Report* (SCSR), *LCP Chemicals, Inc. Superfund Site, Linden, New Jersey*, dated August 2002

Dear Ms. McGowan:

The United States Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) have completed the review of the Site Characterization Summary Report (SCSR), dated August 2002, prepared by Brown and Caldwell. EPA's comments and concerns are set forth in Attachment 1.

EPA believes that additional work needs to be conducted in order to fully characterize the nature and extent of contamination at the Site. In general, EPA agrees with ISP's recommendations to fill data gaps, as outlined in the SCSR cover letter, and has additional recommendations as presented in the attached comments.

ISP should submit a Phase II Remedial Investigation Work Plan and Field Operations Plan, within 30 days of receipt of this letter, outlining the proposed additional work and response to comments.

Please contact Mary Anne Rosa, of my staff, at (212) 637-4407, at your earliest convenience after receiving this letter, to schedule a meeting to discuss the findings as presented in the SCSR, EPA's comments and recommendations on Phase II of the remedial investigation.

Sincerely yours,

Carole Petersen, Chief
New Jersey Remediation Branch

Attachment

cc: Scott MacMillin, Brown and Caldwell
Robert Marcolina, NJDEP
Mark Moese, TAMS

---- ATTACHMENT 1 ----

COMMENTS ON THE SITE CHARACTERIZATION SUMMARY REPORT (SCSR)
LCP CHEMICALS, INC. SUPERFUND SITE, LINDEN, NEW JERSEY

General Comments

1. The SCSR presents three hydrogeologic zones: 1) an uppermost water-bearing zone within the fill and the peat subunit of the Tidal Marsh deposit, 2) an aquitard consisting of the silt and clay subunit of the Tidal Marsh deposit and the Glacial Till, and 3) the aquifer within the upper portion of the bedrock. Gravel and sand, which could be water transmitting zones, were identified within the Glacial Till unit. Therefore, the units comprising the aquitard should be modified to include only the silt and clay subunits of the Tidal Marsh deposit and the silt and clay subunits of the Glacial Till unit; a lower water-bearing zone, consisting of the sand and gravel subunits of the Glacial Till unit, should be added as a fourth hydrogeologic zone. The geologic cross sections shall be modified accordingly and included in the plan that presents the next phase of the RI investigation. Additional borings, wells and slug tests should be conducted to further identify the lithology, extent and nature of contamination, and hydraulic conductivity in the lower water-bearing zone of the overburden.

2. The SCSR provides a summary of soil, groundwater, sediment and surface water data which have been collected. Throughout the discussion of soil contamination, there are assumptions/conclusions drawn regarding whether the contaminants are due in part to site operations or the presence of historic fill materials. Regardless of the source of the contaminants they must still be considered in the risk assessment. The collection of soil samples during Phase II RI, should be collected from the top 0-12" for ecological purposes. Further, soil screening values for ecological receptors should be provided; the New Jersey Non-Residential Soil Screening Criteria are not protective of ecological receptors. Risk-based criteria using US EPA methodology is more appropriate. The groundwater and soil data in the document were only compared to New Jersey criteria and standards. EPA MCLs and soil screening levels should also be considered.

3. The full nature and extent of groundwater contamination has not been characterized. The Phase II RI should include plans to more clearly delineate the horizontal contamination in the shallow aquifer, and should also plan to gather any necessary information needed to determine the potential for off-property migration. The SCSR attributes many of the contaminants in site soils and groundwater to historical fill. There are two problems with this contention. First, if this were the case, then one would expect a random distribution of contaminants in soil. The contaminants would be found in both surface and subsurface soil equally. Instead, the most contaminated soil is found at the surface. This is consistent with

contaminants originating from site operations and spills. Second, based on the sampling results, the risk from the contaminants attributed to historical fill should be quantified and appropriately addressed in the remedy.

4. Based upon the elevated levels of mercury in the wetland and flood plain soils at the Site, and the fact that the previous wetland delineation is greater than five years old, wetland regulations require that a new wetland delineation and jurisdictional determination be performed.

5. One of the primary risk drivers at the Site is elemental mercury. There are three different forms of mercury: elemental, organic and inorganic salts. Each form has different toxicity and requires different screening values. Elemental mercury is volatile. Inhalation is the primary route of exposure. The NJ NRDCSC for mercury is not based on elemental mercury, and therefore, the delineation of the extent of contamination is not appropriate. EPA requires that the Soil Screening Guidance (EPA, 1996; http://www.epa.gov/superfund/resources/soil/index.htm) be used to develop site specific screening criteria for elemental mercury at this site.

6. Additional surface water and sediment sampling must be conducted to delineate the horizontal extent of surface water contamination. This should include additional sediment sampling for dioxin, furan, and polychlorinated naphthalene (PCN) analyses due to the identification of these contaminants in other media at the Site.

7. Due to the historical connection of South Branch Creek to the open drainage system at the adjacent ISP site (formerly known as the "GAF site") and Piles Creek, contamination from the LCP site is likely to be found in surface waters and sediment on the ISP site property and in Piles Creek. Therefore, sampling for site-related contaminants needs to be conducted on the ISP/GAF property and in Piles Creek to determine the extent of contamination associated with the LCP site. Additional surface water and sediment sampling is necessary in the next sampling event. Historically, the network of drainage ditches in place throughout the property to the northwest of the LCP property was connected to South Branch Creek and to Piles Creek. Based on the data presented in the SCSR, the full nature and extent of contamination within this network has not been adequately characterized.

8. Sampling needs to extend into the Arthur Kill. Since the Arthur Kill receives tidal influence from both Newark Bay and Raritan Bay, sampling will be needed north and south of the confluence with South Branch Creek. Based on a review of historic aerial photography, South Branch Creek was connected to the drainage system at the neighboring ISP/GAF site and Piles Creek while operations were ongoing at the LCP facility. Sampling in the Arthur Kill should be conducted in depositional areas near the current and historic discharge points of South Branch Creek and Piles Creek, as well as other areas of site surface water discharge from the LCP site to the Arthur Kill.

9. The list of data objectives for the Phase II RI should include wetland delineation and functional assessment, delineating the extent of contamination in the wetland areas, the extent of sediment and surface water contamination associated with South Branch Creek and the Arthur Kill, and determining the bioavailability of contaminants in these media and the risk to aquatic and terrestrial receptors. It is recommended that the evaluation of the bioavailability of mercury include tissue bioaccumulation studies. Mercury accumulates in aquatic biota and may biomagnify to higher trophic levels. Quantifying the exposure in higher trophic level organisms in ecological risk assessments is often achieved through food web modeling. Models are used to link media that may require remediation (such as sediment) to the risk estimates. Collecting higher trophic level fish to address this exposure pathway is possible at the Site. However, sometimes there can be questions regarding the fidelity of higher trophic level fish to a site. Some estuarine fish, such as mummichogs, have particularly small home ranges and contaminant concentrations in tissue can be closely associated with a site. At the LCP site, mud fiddler crabs are abundant and would serve as a useful indicator of mercury bioavailability. Fiddler crabs are an important food source for estuarine animals including marsh birds, blue crabs, and many other species in the area. Collection of mummichogs and fiddler crabs should be performed.

10. There is significant variation in the depth and thickness of the tidal marsh deposit layer. This layer may retard the vertical migration of the contaminants where present. Therefore, precise information about its vertical and lateral distribution will aid in evaluating the migration pattern of the contaminants. However, in the SCSR the site geologic subsurface conditions are illustrated by only two geologic cross-sections. Additional geologic cross sections should be presented to provide a better conceptual understanding of the tidal marsh deposit and other geologic units.

11. The data gaps pertaining to the configuration of the tidal marsh deposit layer should be identified and the additional investigations planned accordingly.

12. In the Phase I Work Plan, it was planned to drill 25 borings in a grid pattern (spaced 25 to 50 ft apart) through the slabs of buildings 230 and 240 to collect soil samples directly below the slabs for field screening and chemical analysis. In addition, soil samples were to be collected from greater depths within the fill if elevated mercury levels were indicated directly beneath the slabs. Considering the deteriorated conditions of buildings 230 and 240, Brown &Caldwell proposed a horizontal boring program to collect soil samples under these buildings. The proposed sampling program by horizontal drilling could not be completed as planned due to physical obstructions under Buildings 230 and 240. Soil sampling under the floor slabs of both the buildings should be conducted.

13. If the Johnson and Ettinger model is to be included in the human health risk assessment, the following data needs to be collected: soil moisture content, in-place soil bulk density, soil specific gravity, and total organic carbon.

Specific Comments (arranged according to proposed Phase II data objectives presented in cover letter of the SCSR)

14. **"Additional delineation of shallow soils in the western area of the Site, in the vicinity of the former Linden facility."**

- The stated data objective should be clarified to state that chemical testing of soils in this area is considered. The logs for previously completed nearby borings (MW-20 and ADS 8 through 11) are consistent, showing six to eight feet of fill (gravel, with varying proportions of sand and clay) overlying the tidal marsh deposits. Additional borings are to be installed. Chemical testing should be conducted, particularly in borings placed to the south and west of the Linden facility, where no existing data is available. If any past spills within the former Linden Hydrogen Plant building are suspected, or if there are sumps inside the building, an incline boring should also be considered. In addition to Target Compound List (TCL) and Target Analyte List (TAL) contaminants, further site-wide delineation of dioxin/furans and chlorinated naphthalenes should be performed. Lastly, incorrect dioxin equivalency factors were used in mapping the dioxin toxicity equivalents. The correct values can be found in: Martin Van den Berg et al., 1998, *Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife.* Environmental Health Perspectives Vol. 106 Number 12.

- If the term "shallow" is meant to refer to the soils above the tidal marsh deposits, then either a conventional or direct-push (geoprobe) rig would be suitable. If sampling below the tidal marsh deposits is proposed, the borings will have to be double-cased and installed in a manner consistent with the prior stratigraphic borings already completed on-site.

15. **"Delineation of deep soils through the installation and testing of a limited number of borings to determine the vertical extent of contamination identified in the shallow soils."CDM**

- All deep borings that will be advanced below the tidal marsh deposits should be double-cased to prevent downward migration of contaminants.

- Based on the figures presented in Section 5 of the SCSR, there is a widespread distribution of contaminants, particularly mercury and arsenic, throughout the deeper (two to 16 feet) fill. At least one deep boring should be installed in each area of concern, including the former wastewater treatment area, north of building 220, the areas north and south of building 231, and along the eastern side of the sludge lagoon. In light of the gross mercury contamination observed beneath buildings 230 and 240, deep soil samples from this area should be collected.

16. **"Determination of the mercury species in groundwater from a limited number of shallow and bedrock groundwater samples obtained in various areas of the Site", and "Evaluation of the bioavailability of mercury in the surface water in South Branch Creek. This would include a determination of the methyl/total mercury ratio and the particulate concentration of mercury."**

- Methylation of mercury is affected by several factors, including total mercury concentration, salinity and availability oxygen. Consequently, a sufficient number of samples should be selected to ensure that mercury species determination is performed on samples with a wide range of mercury concentrations, and in the case of soil samples, both above and below the groundwater table. In addition, methyl mercury concentrations in South Branch Creek sediments and associated wetland soils must be included to appropriately assess risks to humans and wildlife. Further, consideration should be given to performing a bioaccumulation study using caged fish in South Branch Creek and small mammal trapping on-site to determine the bioavailability of site contaminants for use in the ecological risk assessment.

- In consideration of the need for sampling across a wide range of total mercury concentrations, the testing and shipment of samples containing elemental mercury may be necessary. In prior field operations, samples with visible elemental mercury were not shipped for testing. The shipment of samples containing elemental mercury may need to be shipped as hazardous material.

17. **"Determination of groundwater quality in the bedrock water-bearing zone."**

- All new deep wells must be double-cased to prevent downward migration of contaminants.

- The bedrock investigation should include a downhole geophysics program to identify fracture zones. Bedrock well depths and open-hole intervals (or screen lengths) should be based on the results of this program.

- Investigations at the ISP site to the north demonstrated that deep groundwater flow is to the east, towards the Arthur Kill. However, as stated in Section 3.1.2, groundwater is found predominantly in the fracture planes, and flow is directionally controlled by fracture orientation. The dominant strike of the Passaic Formation is N50°E, and it has a prominent set of fractures striking N45°E. Taking this into consideration, the NJDEP recommends five bedrock wells shown on the attached figure. The locations are near MW-6, MW-11, MW-14, MW-16 and CF-8. Please note that these recommended wells (indicated by ● on the attached Figure) are not intended to be a complete list of wells necessary to fully define the extent of contamination. The Phase II Work Plan shall include a proposal

for the location of additional wells. In addition, site-specific geophysical investigations will aid in determining the locations and depths of bedrock wells.

- Complete TCL/TAL analyses, dioxin/furans, and chlorinated naphthalenes should be included in the determination of groundwater quality.

18. **"Additional characterization of groundwater quality through the collection of a second complete round of monitoring well samples."**

- Determination of mercury species, dioxin/furans, and chlorinated naphthalenes should be included as part of the Phase II sampling.

- The existing monitoring well network does not adequately define the extent of groundwater contamination in the overburden. Additional wells are necessary to fully define the extent of groundwater contamination in the overburden, both within the uppermost water-bearing zone (fill and the peat subunit of the Tidal Marsh deposit) and the zone below the Tidal Marsh deposit. Ongoing or past investigations of groundwater contamination on neighboring properties should be taken into consideration when locating offsite wells. A figure is attached showing approximate locations of wells suggested by the NJDEP. Please note that the following list of recommended shallow wells (indicated by ⊙ on the attached Figure) is not intended to be a complete list of wells necessary to fully define the extent of contamination. The Phase II Work Plan shall include a proposal for the location of additional wells.

  - One shallow well southeast of Building 250. Free product was observed in nearby borings PCA-4 and RR-4 (see Appendix A), and shallow ground water flows off-site in this area (see Figures 4-1 and 4-2).

  - One shallow well southeast of Building 234, between borings RR-6 and RR-7 to monitor free product observed in those borings, as well as nearby HF-B1. Shallow ground water flows off-site in this area.

  - One shallow well by boring BT-B1, to monitor free product as well as elevated mercury, and other inorganics identified in the soils.

  - One shallow well by borings WWT-1 and WWT-1A to monitor free product and mercury observed in soils.

  - Page 4-2, Section 4.1.2 (Occurrence and Flow) of the document indicates that the shallow groundwater is influenced by the site's ditch system and South Branch Creek, and that the resultant groundwater flow pattern is a

groundwater mound. Additional data are necessary to confirm groundwater discharges to surface water features (i.e., ditches and the creek), and to confirm the groundwater mound configuration depicted on Figure 4-1 of the document. Figures presented in the next document need to highlight the site's ditch system, including the areas where the ditch is earthen and where it is concrete lined. Vertical flow components of the groundwater system also need to be investigated as part of the RI/FS process.

Specific Comments

19. **Section 2.3, page 2-6:** Sediment samples should also be analyzed for TOC in addition to grain size analysis.

20. **Table 2-3, page 3 of 5:** There is no Appendix D provided to review the ER-Ls and ER-Ms. It should be noted that the proper reference for these screening values is from "Long, E.R., MacDonald, D.D., Smith, S.L. and Calder, F.D. *1995.Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments*. Environmental Management Vol. 19, No.1. pp. 81-97," rather than USEPA.

21. **Page 3-3, Section 3.2:** The report states, "four lithologic units are encountered beneath the Site between ground surface and a depth of 50 feet." These include:

- A heterogeneous mixture of industrial fill
- A tidal marsh deposit layer consisting of a peat subunit and an organic silt and clay subunit
- A glacial till unit
- Bedrock of the Passaic formation, consisting of a residual soil subunit and a competent bedrock (mudstone) subunit

A very distinct and significant "GLACIAL FLUVIAL" unit is shown under the tidal marsh deposit layer in geologic cross-sections A – A' and B – B' included in the SCSR. A description of this unit should be provided.

22. **Page 3-4, Section 3.2.1.1:** ISP proposes to conduct a historic fill evaluation. This is problematic for the LCP site, because the contamination does not necessarily meet the NJDEP's historic fill definition. Per the Technical Requirements, 7:26E-1.8, historic fill material may not be connected with the operations at the location of emplacement. Also per 7:26E-1.8, historic fill material may not include chemical production waste. In contrast to the Technical Requirements' definition, based on the site history presented in Sections 1.4 and 1.5, mercury and other inorganic constituents are known site contaminants of concern. Even if historic fill is present on the site, it will be difficult for ISP to demonstrate to NJDEP and USEPA that the historic fill has not been connected with operations at the site, for example, discharges

of process waste. Based on the above issues, it is inappropriate to assume that LCP site contamination is the result of historic fill. Similarly, ISP's statement that "encapsulation is the remedy of choice for sites with contaminated historic fill" is not be applicable to the LCP site.

23. **Page 5-1, Section 5.1:** ISP states that no additional samples were submitted for laboratory analysis as a result of the tank assessments. Based on review of Table 5-1, the EPA and NJDEP do not concur with ISP's decision, and recommends sampling of the following tanks and the environment surrounding the associated tank, pursuant to NJAC 7:26E-3.9(a)1:

- Import Tank, Map ID 7 - has suspected release, potential future release, stained ground, tank interior is accessible.
- 150K Brine Tank, Map ID 11 - product is in tank, tank is rusted.
- 250 Gal Petroleum Tank, Map ID 20 - has suspected release, stains on ground, rusted tank.
- HCl Tank, Map ID 25 - has suspected release, crystalline residues on tank nozzle.
- Bullet Tanks, Map ID 26 - product is in tank, has suspected release.

24. **Page 5-2, Section 5.2, Chemical Constituents:** The SCSR does not address free product found in numerous soil sample locations. The Boring Records in Appendix A indicate the presence of "Free Liquids Organics" in a number of borings. The NJDEP assumes that the ISP terminology "Free Liquids Organics" is analogous to free product. For example, note the following borings. The examples include, but are not limited to, the following:

-231-B6 , free liquids organics, 8-10' bgs, interval not analyzed, depth below not analyzed, Boring Records page 14 of 112
- 150K-1, free liquids organics at multiple depths, intervals not analyzed, depths below not analyzed, Boring Records page 2 of 112
-231-B1, free liquids organics, 6-8' bgs, interval not analyzed, depth below not analyzed, Boring Records page 8 of 112
-RR-4, free liquids organics at multiple depths, depth below not analyzed, Boring Records page 81 of 112
-RR-6, free liquids organics, 8 -10' bgs, interval not analyzed, depth below not analyzed, Boring Records page 82 of 112. This issue should be addressed in the Phase II Work Plan.

25. **Page 5-2, Section 5.2:** All boring locations with "Free Liquids Organics" should be depicted on a figure, along with the specific depths in which the free product was encountered. Discussion should be included which addresses whether vertical delineation of the soil contamination was performed via laboratory analyses. If not,

these are data gaps that need to be addressed during Phase II via further sampling and laboratory analyses.

26. **Page 5-2, Section 5.2, Tables and Figures:** There are significant deficiencies in the assessment of the nature and extent of soil contamination, as presented in the SCSR. Soil sample results are arranged and depicted such that it is extremely difficult for the reviewer to readily identify the specific samples with exceedances to the NJ Soil Cleanup Criteria and the specific sample depths with exceedances. The tables and figures require substantial revision in order to meet the requirements of NJAC 7:26E. Major concerns are as follows:

- For comparison purposes, the data should also be compared to the New Jersey Residential criteria. Figures 5-2 through 5-30 should be revised. Figures must be revised to label/identify the samples, along with the specific depths in which the contamination above criteria was encountered. ISP's figures, in contrast, fail to identify/label the specific sample, and do not specify the precise sample depth(s) with exceedances.

- **Table 5-3** lists the soil samples with results exceeding the NJ Non-Residential Direct Contact Soil Cleanup Criteria. The table is based on contaminants of concern. Such presentation of analytical results in Table 5-3 is cumbersome and makes review extremely difficult. Samples are not presented in a logical order (for example, on an Area of Concern Basis, in numerical order, etc.). Equally important, sample depth intervals for the same boring are often pages apart, so it is not possible for the reviewer to determine whether the vertical extent of contamination has been determined. The table must be revised.

27. **Page 5-4, Section 5.2.1, Elemental Mercury:** The presentation of the borings and sample depths in which elemental mercury were encountered is insufficient and needs to be expanded and clarified. Figures must be provided that label / identify the sample locations, along with the specific depths in which the elemental mercury was encountered. A discussion should be presented to address whether the sample depth below the elemental mercury was analyzed at the laboratory. If not, this represents a data gap and needs to be addressed in the Phase II Work Plan. For illustrative purposes, see 5K-B3, free liquids mercury, surface-6' bgs, depth below not analyzed, Boring Records page 18 of 112.

28. **Page 5-6, Chromium:** Based on the highly elevated concentrations of chromium detected (in excess of 7000 mg/ kg), the NJDEP recommends analyses for hexavalent chromium in soils.

29. **Page 5-10, Section 5.2.4, Table 5-8:** The assessment of 2,3,7,8-TCDD toxicity equivalents does not include any of the supporting data for the individual congeners. As a result, the NJDEP can not verify whether the toxicity equivalents

listed in Table 5-8, Column 4, were calculated correctly. The supporting data should be provided.

30. **Page 5-10, Section 5.2.4:** Rather than using the USEPA 1989 toxicity equivalent factors (TEFs) to evaluate dioxins and furans, the most updated toxicity equivalents from a 1997 meeting of the World Health Organization should be used. The specific journal reference is: Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife", Martin Van den Berg, et. al., Environmental Health Perspectives, Volume 106, Number 12, December 1998.

31. **Table 6-1, Ground Water Results.** The table should be amended to include the TICs. While the State of New Jersey does not have a contaminant specific ground water quality criteria for TICs, Table 2 of the Ground Water Quality Standards (N.J.A.C 7:9-6) provide interim generic ground water quality criteria. For any synthetic organic chemical with evidence of carcinogenicity, the interim generic ground water quality criteria are 5 μg/l for each compound, and 25 μg/l for the total. For synthetic organic chemicals lacking evidence of carcinogenicity, the interim generic ground water quality criteria are 100 μg/l for each compound, and 500 μg/l for the total.

32. **Section 6.0, Ground Water Quality Assessment, page 6-1 et seq.** A discussion should be presented that addresses the location of the existing monitoring wells as they relate to the areas on site having elevated soil contamination, especially the "free liquids - mercury" and "free liquids - organics". It should also include a discussion regarding the depth of soil contamination relative to the water table. Soil contamination above migration to groundwater screening criteria may be acting as ongoing sources of contamination.

33. **Section 6.2, page 6-4:** The elevated levels of aluminum and manganese in groundwater do appear to be "unusually" elevated. It should be noted whether past operations may have changed the leachability of site soils. The SCSR contends that manganese as high as 153 mg/l is naturally occurring. If this concentration of manganese is naturally occurring, then the upgradient concentration will equal the on-site concentration. In the absence of upgradient data, manganese is assumed to be site related.

34. **Section 6.2 and 6.3, Other Metals and Organic Compounds, pages 6-2 through 6-5.** The SCSR attributes much of the contamination in the groundwater to dissolution from historic fill. Given the long and varied industrial history of the site, it is the EPA's and NJDEP's position that site operations, not historic fill, is the predominant source of both soil and groundwater contamination.

35. **Section 6.3, page 6-5:** In the last complete sentence on this page, it is assumed that the sentence should read, ". . . other sources can **not** be discounted."

36. **Section 7.0,** Figures: All figures need to be modified to label/identify the sample locations.

37. **Section 7:** The sediment and surface water locations on the site figures should be labeled. Sampling should continue into the Arthur Kill, both north and south of the Site to delineate the extent of contamination.

38. **Section 7.1, page 7-1:** The text incorrectly reports that South Branch Creek is man-made. Based on a review of historical aerial photographs, South Branch Creek has been rerouted, but this water body historically existed at the Site. The text should be corrected.

    In addition, although no fish community data have been provided for South Branch Creek, several species have been observed in similar small creeks entering the Arthur Kill (Garman and Harris, 1999). Salt marshes are located along both banks of South Branch Creek, and its shorelines provide important shallow water habitat. Bottom substrates of the creek provide suitable habitat for polychaetes, fiddler crabs, and other shellfish. South Branch Creek is likely to be used by a variety of marine and anadromous fish. White perch, American eel, mummichog, and shrimp are among the species likely to be found in South Branch Creek.

39. **Figure 21405-001** - Sampling locations DC-SS-11 and EC-4 are not identified on the figure, but are listed on Table 2-1.

REFERENCES

Beckvar, N., J. Field, S. Salazar, and R. Hoff, 1996. Contaminants in > Aquatic Habitats at Hazardous Wastes Sites: Mercury. NOAA Technical Memorandum NOS ORCA 100. Seattle: Hazardous Materials Response and Assessment Division, National Oceanic and Atmospheric Administration. 74 pp.

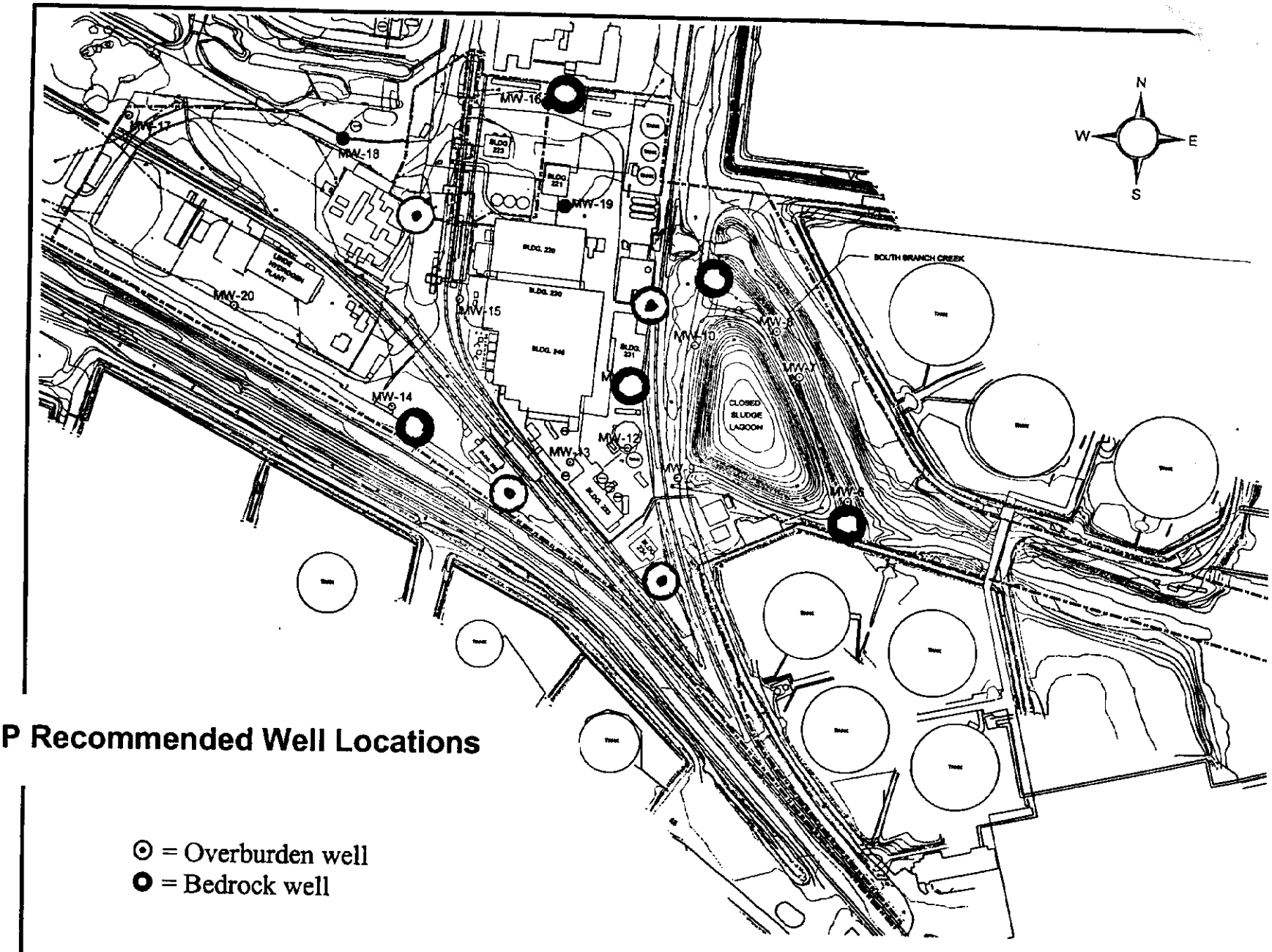
http://response.restoration.noaa.gov/cpr/sediment/mercury.html

Garman, G. and L. Harris, Eds., 1999. Coastal Hazardous Waste Site > Reviews, April 1999. Seattle: Coastal Protection and Restoration Division, Office of Response and Restoration, National Oceanic and Atmospheric Administration. 138 pp.

NJDEP, 2002. New Jersey Fish and Wildlife Digest: A Summary of Rules and Management Information. New Jersey Department of Environmental Protection, Division of Fish and Wildlife. Vol. 15, No. 3, 2002 May 2002.

Long, E.R., MacDonald, D.D., Smith, S.L. and Calder, F.D. 1995.Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management Vol. 19, No.1. pp.81-97,

Van den Berg, M., L. Birnbaum, A.T.C. Bosveld, B. Brunstrom, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S.W. Kennedy, T. Kubiak, J.C. Larsen, F.X. van Leeuwen, A.K. Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M. Tysklind, M. Younes, F. Waern, and T. Zacharewski. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ. Health Perspect. 106:775-792.



NJDEP Recommended Well Locations

⊙ = Overburden well

● = Bedrock well

SDM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007

FEB - 6 2006

FEB - 9 2006

J. David McNichol
ISP Environmental Services, Inc.
1361 Alps Road, Bldg. 8-3
Wayne, New Jersey 07470

Re: Comments on the Phase II Remedial Investigation Work Plan and the Historic Drainage Analysis Report for the LCP Chemicals, Inc. Superfund Site, Linden, New Jersey

Dear Mr. McNichol:

The United States Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) have completed the review of the Phase II Remedial Investigation Work Plan (RIWP), prepared by Brown and Caldwell, and the Historic Drainage Analysis Report, prepared by Brown and Caldwell, for the LCP Chemicals Superfund Site (Site) located in Linden, New Jersey. EPA's comments and concerns on the RIWP are set forth in Enclosure 1. EPA's comments on the Historic Drainage Analysis Report are set forth in Enclosure 2.

ISP should submit a revised Phase II Remedial Investigation Work Plan, within 30 days of receipt of this letter, addressing EPA's comments.

Please also note that Jon Gorin, of my staff, is now the Site's EPA Remedial Project Manager. If you have questions or would like to discuss any Site issues, please contact Jon at (212) 637-4361.

Sincerely yours,

Carole Petersen, Chief
New Jersey Remediation Branch

Enclosures

cc: Scott MacMillin, Brown and Caldwell
Frank Faranca, NJDEP

Enclosure 1 - Phase II RIWP Comments

1) **Comment 1, Pages 1 and 2, Vapor Intrusion**:When evaluating the vapor intrusion pathway, the Phase II RIWP must address EPA's guidance "Evaluating the Vapor Intrusion into Indoor Air" (November 2002, http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm) and NJDEP's Vapor Intrusion Guidance Document (October 2005, internet web site http://www.state.nj.us/dep/srp/guidance/indoor_air/). EPA and NJDEP utilize not only groundwater data but also soil gas data and, if warranted, indoor air data in assessing the vapor intrusion pathway. Evaluation of the vapor intrusion pathway for the LCP site shall not be limited to solely mercury. For example, due to the presence of "free organic liquids", the corresponding additional chemicals that comprise the "free organic liquids" for potential vapor intrusion issues shall be evaluated. Please refer to NJDEP's Technical Requirements (NJAC 7:26E) and the above referenced vapor intrusion guidance document for detailed information on issues such as potential contaminants of concern for vapor intrusion and vapor intrusion screening levels.

2) **Comment 2, Page 2, and Brown and Caldwell Cover Letter Dated July 15, 2004, Ecological Risk Assessment:** The ecological risk assessment must include small mammal tissue testing. The LCP Site has a serious mercury contamination problem with the potential for widespread aquatic and terrestrial ecological impacts. The modeled ecological hazard index for small mammals was 70,000 (Final LCP SLERA [May 11, 2004], shrew "desk-top" model, page 5-3 and Table D-9) clearly justifying the importance and necessity for small mammal testing.

3) **Comment 3, Page 3, Historic Fill:** ISP's position, which is to attribute all inorganics contamination (with the exception of mercury), and nearly all organics contamination in soil and groundwater to historic fill, remains unacceptable. Project documents submitted by the responsible party detail discharges related to former industrial activities at the site. ISP's rebuttals within this current response to comments letter again fail to demonstrate that the LCP site soils meet the definition of historic fill material, pursuant to NJAC 7:26E-1.8. Even if the soils were determined to be historic fill, ISP would still be responsible for any discharges that occurred and media impacted (soils, sediments, groundwater, surface water, biota, vegetation, etc.). Such discharges would include, but not be limited to, those previously detailed in Agency comments to the responsible party.

Therefore, and without reiterating the numerous prior comments regarding this issue, all EPA's and the NJDEP's previous comments regarding the historic fill issue stand. It is inappropriate for ISP to continue to attribute all inorganics contamination, with the exception of mercury, and nearly all organics contamination in soil and groundwater to historic fill. ISP's language to that affect within the Site Characterization Report does not accurately reflect the Agencies position and thereby is a potential misrepresentation in the administrative record. The LCP Site remedial investigation, feasibility study and remedy

selection needs to account for not only mercury contamination, but also all site-related contamination. Please revise the work plan accordingly.

4) Since many of the new sample locations reference historic sampling points, either include a separate figure of these historic sample locations or place the referenced points as light impression or watermark on Figure 3-1.

5) An additional bedrock well is needed next to MW-23S to define the vertical extent of contamination in the interior portion of the site as previously discussed.

Comments on ISP Draft Addendum No. 1 Work Plan Phase II Remedial Investigation (Phase II RIWP), Document Dated July 2004

4) ***Ecological Investigations - small mammal testing*** - The site has contamination which impacts terrestrial ecological receptors. The Screening Level Ecological Risk Assessment estimates a hazard index of 70,600 for small mammals, thus indicating the need to evaluate the risk to terrestrial ecological receptors by conducting small mammal testing. By comparison, hazard indices greater than 1 indicate possible adverse effects to ecological receptors. Generally, the mammals that are utilized for these types of studies are mice, shrews and voles. This provides a broad spectrum of food habits and gives a good indicator of bioaccumulation. The data generated will be used in food chain models to higher trophic level birds and mammals to determine if they are at risk. If risk is indicated, the small mammal data are used to back-calculate terrestrial soil cleanup numbers. These recommendations for small mammal testing are routine, especially in the presence of a persistent biomagnifying contaminant such as mercury.

5) **Issues From Agencies May 12, 2004 Site Visit** - As a result of the May 12, 2004 site inspection an issue arose regarding the integrity of the post-closure maintenance for the RCRA surface impoundment, and deficiencies in the maintenance of engineering controls for the former Linde Chemical property. As a separate section of the work plan, provide a description of the monitoring wells located around the RCRA surface impoundment and provide a sampling schedule that would be in compliance with the RCRA closure process.

6) **Free Product in Borings** - Identification of borings with free product and vertical delineation of the product is required. In the response to comments, ISP indicates that borings are included in the Phase II RIWP to address "free organic liquids". NJDEP has compared Figure 1 of the response to comments letter with Figure 3-1 of the Phase II RIWP. This comparison indicates that ISP has not adequately addressed NJDEP and EPA's comment because vertical delineation is not proposed at each location where free organic liquids are present. The Phase II RIWP needs to be revised, accordingly. Also please identify on Figure 1 the type of free organic liquids present at each specific location.

7) **Section 2.0, Data Objectives (page 2-1, fourth and fifth bullets; page 2-2, fourth and fifth bullets)** - This section should identify the objectives that would be achieved by determining the methyl mercury concentrations in soil, groundwater, and surface water. Due to the variety of factors influencing mercury speciation, a sophisticated model would need to be developed to attempt to predict methylation under various conditions. The limited proposed sampling for methyl mercury is unlikely to be useful for such a model. Total mercury concentrations in soil, groundwater, surface water, and sediment will most likely need to be used to conservatively evaluate mercury availability. Tissue concentrations of mercury will provide more reliable information on mercury availability under the current conditions than modeling.

8) **Section 2.0 Data Objectives, page 2 -2: The sixth bullet** indicates "selected metallic constituents in sediment and surface water" will be delineated. As the extent of contamination is being delineated, samples should undergo a full TCL and TAL analyses along with analysis for methyl mercury.

9) **Section 2.0, Data Objectives (page 2-2, last bullet)** - must include collection of terrestrial tissue (e.g., small mammals) to support the Baseline Risk Assessment.

10) **Section 2.0 Data Objectives, page 2 -2** - The eighth bullet notes the collection of biota tissue samples. Please note that whole body tissue data are necessary for ecological evaluation and small mammal tissue must be specifically noted. Please revise.

11) **Task 3 – Soil Quality Characterization (page 3-2, second paragraph)** - should specify how the results of the analyses for various species of mercury would be used. If modeling mercury is planned, information needs to be provided on the model that would be used.

12) **Subtask 3.1 – Shallow Soils (page 3-3, third paragraph)** - discusses the "former Linde Hydrogen Plant." The location of this plant needs to be indicated on a figure and the figure referenced in this paragraph.

13) **Subtask 3.1 – Shallow Soils (page 3-4, second paragraph)** - indicates that shallow borings will be collected to the top of the tidal marsh deposit, if present, or else to the top of native soils. Justification for collecting to these depths needs to be presented. Subtask 3.1 - Paragraph 2 - The work plan cites shallow soil borings (LB-1 -LB-3), the site map refers to these as (LB-101 - LB-103). The maps and plans should be revised to make the text and site map consistent.

14) **Subtask 3.2 – Deep Soils (page 3-5 and 3-6)** - presents the rationale for the locations of 14 deep soil borings. MW-B6D is designed to characterize soils in the "eastern portion of the site," MW-B14D is designed to characterize soils in the "southwestern portion of the site," MW-B16D is designed to characterize soils in the "northern portion of the site," MWB17D and MW-B18D are designed to characterize soils in the "northwestern portion

of the site," MW-B20D is designed to characterize soils in the "western portion of the site," MW-B21D is designed to characterize soils in the "southeastern portion of the site," and MW-B25D is designed to characterize soils in the "northeastern portion of the site." One additional deep soil borings in each of the above mentioned portions of the site should be collected in order to sufficiently characterize the entire portions of the site indicated.

15) **Subtask 3.2 – Deep Soils (page 3-7, first paragraph)** - states that samples will not be collected above the tidal marsh deposits "if the boring location has previously been evaluated during prior site investigations. Analysis of a sample from above the tidal marsh deposits is required even if the area has been previously sampled.

16) **Subtask 3.2 - second paragraph** - All the proposed deep boring sampling locations in the text are MW-B#D in the text, compared to just MW-#D on the site map. Please correct for consistency.

17) **Subtask 3.3 - second paragraph** - All the proposed deep horizontal boring sampling locations in the text are HB-###, compared to the site map where a letter is placed after boring number to show specific sampling points. Additionally, the map does not contain labels at all proposed horizontal grab locations. Please modify the map and text to list all proposed sampling points for each horizontal boring.

18) **Subtask 5.1 – Water Table Monitoring Wells** - EPA and NJDEP approve of the proposed shallow well locations. One additional water table monitoring well is required in the location of BT-B1, to monitor free product, elevated mercury and other inorganics identified in the soils.

19) **South Branch Creek Aquatic Biota Samples, Figure 3-2, Table 3-3, RIWP Task 11** - ISP proposes to perform aquatic biota sampling solely at Transects C, D, and E. ISP also caveats that samples might only be able to be collected at the station nearest the creek outlet due to insufficient water during low tide, and that sufficient sample mass may be unavailable. The proposed aquatic biota sampling plan is insufficient and unacceptable. The scope must be revised to address the following:

- ❑ Aquatic biota sampling shall be conducted at locations in the vicinity of Sed-1 and Sed-2. Prior investigations detected highly elevated levels of sediment contamination that is orders of magnitude above ecological benchmark screening values. Locations Sed-1 and Sed-2 are situated near the headwaters of South Branch Creek and its intersection with the former plant process and discharge areas. Prior site inspections conducted by NJDEP and NOAA staff provide indisputable documentation that fiddler crabs are abundant at the Sed-1 and Sed-2 areas.

- ❑ Since biota samples must be co-located with media sample locations, additional transects for the collection of sediment and surface water data must be placed at the Sed-1 and Sed-2 locations. Additionally, biota must be collected at all transects, not limited to Transects C, D, and E, as proposed on p. 3-16.

20) **Table 3-3, Page 5 of 5, Notes -** states that samples may only be able to be collected at the station nearest the creek outlet (presumably Transect E), and that sufficient sample mass may be unavailable. Both proposals are unacceptable. The presence of biota such as fiddler crabs in South Branch Creek at locations other than Transect E have been seen during prior site inspections. These samples must be collected.

21) **Task 9 – Wetland Soils Characterization (page 3-14, third and fourth paragraphs) -** Soil samples should be representative of the top 6 inches of sediment, and the top 12" of soil (Table 3-3). It is noted that "no bordering wetlands soils were apparently available from which to collect a sample." Based on prior field visits there is a wetland buffer along the creek from which samples should have been collected. Samples need to be collected in the mudflats and in the vegetated fringe as part of Task 9.

22) **Task 10 - first paragraph** - The text states that a series of four transects (A-D) will be sampled along South Branch Creek and a fifth transect (E) will be sampled downstream within LCP property. Figure 3-2 has 5 transects (A-E) from upper reach to Arthur Kill outlet and a sixth (F) at property line within the Arthur Kill. Please correct text to reflect Figure 3-2.

23) Since the concentration of mercury in sample SED-6 was significant and the Arthur Kill is subject to tidal flow, additional sediment samples are needed north and south of the property line within the Arthur Kill to further delineate contamination from the site. A minimum of two samples, 100-200 feet a part, in both the northerly and southern direction (minimum of four total) that line up with Transect E and target depositional /mudflat areas (not mid channel) should be sampled. Depending upon the tidal flow and habitat, more sample locations may be warranted. (See Figure 3-2 Locations of Proposed South Branch Creek Samples).

24) **Task 10 – South Branch Creek Sediment and Surface Water Samples (page 3-15; first, second, and fourth bullets)** - indicates that three surface samples will be collected "at the approximate midpoint, and halfway to each edge of the channel." The depth of the samples should be identified in this section; (the required depth is 0-6 inches). Samples should be biased toward the mudflats or other shallow areas rather than the middle of the channel.

25) **Task 10 – South Branch Creek Sediment and Surface Water Samples (page 3-15, third bullet)** - The third bullet on page 3-15 indicates that only one marsh soil sample from each side of the channel will be collected. This is insufficient to estimate contamination in the marsh area; additional samples must be collected. As this is a tidal creek, a minimum of two additional marsh soil samples from each bank at each transect is recommended to better delineate the extent of contamination. This does not rule out the likelihood that future delineation may still be required. These sample locations should be identified in Figure 3-2.

26) **Task 10 – South Branch Creek Sediment and Surface Water Samples (page 3-15, last paragraph)** - discusses "three additional surficial grab samples" that will be collected to delineate an apparent arsenic hot spot at SED-2. These samples are not indicated on Figure 3-2. Based on observations of this area during a site visit, tissue samples as well as collocated sediment samples must be collected at this location for the full suite of contaminants.

27) **Task 10 – South Branch Creek Sediment and Surface Water Samples (page 3-16, second paragraph)** - discusses the analyses that will be conducted for sediment and surface water. The first sentence should read "The sediment samples will be tested for …" rather than "The samples will be tested for …" This paragraph should indicate the other field parameters that will be measured in surface water (i.e., dissolved oxygen, temperature, and conductivity). The analyses for the "remaining sediment and surficial marsh samples" must also include the full target analyte list (TAL) metals, target compound list (TCL) organics, tentatively identified compounds (TICs), and PCDD/PCDF rather than only the few targeted metals indicated.

28) **Task 10, p. 3-16** - The text states that remaining sediment and surface marsh samples (if collected) will be analyzed for a reduced list of contaminants. No justification is provided for this proposal. These samples must be analyzed for the same contaminants as the South Branch Creek channel samples, to afford completeness and comparability of data. The first sentence (page 3-16, second paragraph) should read "The <u>sediment</u> samples will be tested for …" rather than "The samples will be tested for …" This paragraph should indicate the other field parameters that will be measured in surface water (*i.e.*, dissolved oxygen, temperature, and conductivity). The analyses listed in Table 3-3 for the low marsh soil are inconsistent with those proposed on page 3-16. No justification is provided for this proposal. It is required that the analyses noted in Table 3-3 (i.e., TAL/TCL, TICs, and PCDD/PCDF) are conducted, rather than the limited scope proposed on page 3-16. In this way these samples will be analyzed for the same contaminants as the South Branch Creek channel samples, which will afford completeness and comparability of data.

29) **Task 10 - South Branch Creek Sediment and Surface Water Samples, pages 3-15 - 3-16** - The proposed sampling scheme is insufficient for characterization of the creek. Although previous sediment samples have been collected in the headwaters (SED -2, SED -1), it is required that additional transects (for the collection of sediment and surface water) be placed in this area to provide media data for the recommended collection of biota data (see comments below). The three grab samples proposed near SED-2 (SED-7, SED-8, and SED-9) should be identified with a red dot on Figure 3-2. Transect F (as identified on Figure 3-2) should be discussed in the text. To better characterize the creek additional transects to be added such that they are no more than 200 feet apart (e.g., as proposed, distance between Transects A and B is 300 feet; between Transects B and C is 400 feet). This could be accomplished by adding two transects (one between A and B; another between B and C). Further, an additional transect at former location "Sed-1" should also be added to further characterize this area.. Further, the "outlet to the Arthur Kill" should be identified on the figure.

30) **Task 11 – South Branch Creek Aquatic Biota Samples (page 3-16, fifth paragraph)** - identifies the proposed aquatic biota sampling stations. The three transect locations proposed are not sufficient, they do not begin close enough to the facility, and they are too far apart (approximately 300 feet). More aquatic biota sampling locations are needed.

31) **Task 11 – South Branch Creek Aquatic Biota Samples (page 3-17, first bullet)** - indicates that mummichogs will be collected only at the stations where open water remains throughout the tidal cycle. This is not appropriate. Mummichogs should be collected during high tide. As indicated earlier in these comments, biota samples need to be collected at additional stations and closer to the facility than the proposed "Transect C."

32) **Task 11 – South Branch Creek Aquatic Biota Samples (page 3-17, second bullet)** - indicates that fiddler crabs will be collected "within 50 feet up and downstream of the … transect." This is too large an area (100 feet) and will be difficult to correlate to the corresponding sediment sampling location. Fiddler crab density is high enough at the site that sufficient biomass can be collected in a much smaller area.

33) **Task 11 – South Branch Creek Aquatic Biota Samples (page 3-17, third bullet)** - indicates that at least "3-5 whole specimens" will be collected at each biota sampling station but does not specify whether this volume is for mummichogs or for fiddler crabs. The anticipated number of specimens for both mummichogs and fiddler crabs that would equal approximately 50 grams should be specified ("3-5 whole specimens" probably refers to mummichogs, but the text must be clarified).

34) **Task 11 – South Branch Creek Aquatic Biota Samples (page 3-17, last paragraph, and page 3-18, first paragraph)** - indicates the limited lists of contaminants that will be included in the mummichog tissue analysis (four metals) and the fiddler crab tissue analysis (five metals). These limited lists are inappropriate. Mummichog and fiddler crab tissue must be analyzed for the full TAL and TCL of contaminants in addition to TICs, TCDD, TCDF, and lipids.

35) **Task 11 - South Branch Creek Aquatic Biota Samples, Figure 3-2, Table 3-3, pages 3-16 - 3-18 -** The proposed aquatic biota sampling plan is insufficient; however with the addition of the recommended transects and locations, and with the collection of available biota at each transect, the workplan design would be considered satisfactory. The following issues must be addressed:

- ❑ Aquatic biota sampling shall be conducted at locations in the vicinity of SED-1 and SED-2. Prior investigations detected elevated levels of sediment contamination that are orders of magnitude above ecological benchmark screening values. Locations SED-1 and SED-2 are situated near the headwaters of South Branch Creek and its intersection with the former plant process and discharge areas. During prior site inspections fiddler crabs appeared to be abundant at the SED-1 and SED-2 areas.

- ❑ Refer to Table 3-3, page 5 of 5, Notes. ISP indicates that samples may only be able to be collected at the station nearest the creek outlet (presumably Transect E), and that sufficient sample mass may be unavailable. Both proposals are unacceptable. As indicated above, there has been documentation of the presence of biota such as fiddler crabs in South Branch Creek at locations other than Transect E.

- ❑ Biota should be collected at all transects (i.e., in the vicinity of SED-1, SED-2, Transect A, Transect B, Sed-3, Sed-4, and Transect F) and not limited to Transects C, D, and E, as proposed on page 3-16. Mummichogs should be collected during high tide, rather than only at the stations where open water remains throughout the tidal cycle (page 3-17, bullet # 1). The second bullet on page 3-17 indicates that fiddler crabs will be collected "within 50 feet up and downstream of the … transect." This is too large an area (100 feet) and will be difficult to correlate to the corresponding sediment sampling location. Fiddler crab density is high enough at the site that sufficient biomass can be collected in a much smaller area. The third bullet should indicate whether the "3-5 whole specimens" proposed for collection is for mummichogs or for fiddler crabs.

36) **Task 12 - Reference Stream Samples, page 3-18 -** EPA must review and approve the selection of the stream to be used as a reference. Information regarding the proposed reference stream may be included in the revised Phase II RIWP or under separate

submittal, prior to the Phase II RIWP submittal. EPA and/or NJDEP may conduct a site visit to the reference stream to determine its suitability for use.

37) **Table 3-3** - it should be noted in this section that samples will be collected from the top 0-6 inches. Further, samples should be biased toward the mudflats or other shallow areas rather than the middle of the channel.

38) **Figure 3-2: Proposed locations Sed 7, 8, and 9** - should be indicated with a red dot, not a blue square.

39) **Section 4.1, Site Characterization Summary Report (page 4-1, second bullet)** - indicates that the site and reference area results will be compared statistically. More information should be provided to ensure that sufficient sampling is proposed to conduct the statistical analyses.

40) **Section 4.1, Site Characterization Summary Report (page 4-1, fourth bullet)** - indicates that a comparison will be conducted on the depurated vs. undepurated fiddler crab results. More information needs to be provided on how these data would be used.

41) **Section 4.1, P. 4-2** - Details regarding data evaluation and interpretation procedures must be included in the work plan, especially for methyl mercury (all media) and mercuric- and mercurous-mercury species in soils. For example, it must be specified if data will be compared to information available in the scientific literature, or if/how they will be used in food chain models, etc. The work plan must also specify how tissue residue effects levels for the protection of fish will be addressed. EPA is concerned regarding text on page 4-2 that states "biological uptake factors will be calculated if the data are suitable," since use of the data in this manner is a fundamental objective of the biota sampling program (i.e. determination of hazard quotients in the ecological risk assessment and calculation of preliminary remediation goals). A list of "key data analysis issues" is presented, but it must be clarified how they will be used to determine that meaningful conclusions cannot be drawn.

42) **Figure 6-1, Project Schedule** - Biota sampling should optimally be conducted in late summer/early fall, since more bacterial activity in sediments during warmer months, thus higher methyl mercury production, would allow maximum mercury accumulation.

Enclosure 2

LCP Historic Drainage Analysis, document dated July 2004

General Comments:

1. The argument that it is unlikely that surface drainage and groundwater flow has been from LCP to Piles Creek is logical based on the information provided. However, the work plan does not provide any topographic information to support this argument. Without topographic information it is not possible to verify conclusions about surface water flow. Please provide topographic information.

2. Please provide a description of how flow directions, as indicated on the figures, was determined. The only topographic data shown is on Figure 1-1.

3. Additional groundwater flow maps (overburden and bedrock) should be included for the ISP-ESI (GAF Chemical) site. Only one figure (Figure 1-2) is included.

General Comments on Figures:

1. The arrows on Figures 1-4 to 1-7, are not defined in the legend.

2. Please indicate if all the features in gray on Figure 1-3 through 1-7 are current site features or if they are historical.

3. Figure 2-1: The analysis states that fill separates the northern half of channel C1 and tidal creek TC1 thereby preventing flow from channel C1 to Piles Creek. However, based on the photo in Figure 2-1, it looks like the northern end of C1 and TC1 may be separated by a spill way or gate. If opened at low tide it would allow flow out and tidal action would flush the channel C1 thereby providing a pathway to Piles Creek. Provide additional information that document that channel C1 and tidal creek TC1 where separated?

Specific Comments:

Page 6 - The statement that "Past groundwater flow patterns from the LCP site would also not have flowed towards Piles Creek given historical patterns of surface water flow" is made in the analysis. Please explain the basis for this statement. What data, logic, or other information is this statement based on?

- With respect to groundwater flow, the report refers to Anderson (1968) and to site specific mapping; the conceptual models applied to the bedrock in the area of the site have changed significantly since 1968. The current conceptual model and site specific data should be presented and the case should be made as to why groundwater flow is not to Piles Creek.

Page 9 - Paragraph 5 - It is stated that "Evidence is presented in Section 2.0 that reveals the lack of physical connection from the drainage system in the eastern portion of the ISP-ESI site (to which LCP connected) over most, if not all, of the period that LCP was in operation." If LCP was connected during the period it was in operation then does this mean contaminants could have migrated to Piles Creek? Please explain.

Page 13 - 3rd Paragraph - This paragraph is confusing. Please examine and reword as appropriate.

Page 15- 3rd Paragraph - Reference to Figure 2-5 is incorrect. It should be Figure 2-7.
4th Paragraph - Please indicate the location of channel C3 referred to in the text.
5th Paragraph -"C1 is clearly...upgradient of the LCP site.." Provide the topographic data that would support this assertion?

Page 16 - Second Paragraph - CT4 is not shown on Figure 2-8

Page 18 - 7th Paragraph -A figure showing the route of the South Branch Creek and Avenues A, B, and C would be helpful

Page 24 - 5th Para - The summary states that the drainage at LCP was hydraulically separated from Piles Creek with the possible exception of a three year period from 1966 to 1968. Further discussion should be provided.

Legend

- Boring with observed saturation of unidentified organic liquid
- Boring with no observed saturation of unidentified organic liquid

MW-17D
7-9, 9-11

WWT-1
10-12

WWT-101
8-10, 12-14

MW-24S
6-8

BT-B1
6-8

231-B13
6-8

231-B6
8-10

231-B8
8-10

MW-11D
6-8, 26-28

5K-B4
2-4, 4-6

RR-4
6-8, 8-10

PCA-4
4-6

150K-1
4-6, 8-10

RR-6
8-10

MW-21S
8-10

RR-7
8-10

HF-B1
6, 8-10

0 50 100 200 300
Feet

FIGURE X-X

RESIDUAL ORGANIC LIQUID SATURATION IN SUBSURFACE SOILS

LCP CHEMICALS, INC.
SUPERFUND SITE
LINDEN, NEW JERSEY

DATE
8/2/2013

PROJECT NUMBER
135451.103

Brown AND Caldwell

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SOIL RESULTS EXCEEDING NON-RESIDENTIAL DIRECT CONTACT CLEANUP CRITERIA
LOCATIONS OF OBSERVED RESIDUAL ORGANIC LIQUID SATURATION
LCP Chemicals, Inc. Superfund Site, Linden, New Jersey

Boring/Well ID	Date	Type	Top Depth	Bottom Depth	Chemical Name	Concentration (mg/kg)	NRDCSRS	Total Volitile TICs (mg/kg)
Phase I								
231-B13	9/19/2001	VOCs	8	9	Methylene Chloride	690	87	0
231-B6	9/27/2001	SVOCs	4	6	Hexachlorobenzene	6.69	1	0
231-B6	9/27/2001	PCBs	4	6	Aroclor 1254	43.2	1	
231-B8	9/27/2001	Metals	8	10	Arsenic	48.1	19	834
231-B8	9/27/2001	SVOCs	8	10	1,2,4-Trichlorobenzene	4640	820	
231-B8	9/27/2001	SVOCs	8	10	1,4-Dichlorobenzene	158	12	
231-B8	9/27/2001	SVOCs	8	10	Hexachlorobutadiene	233	25	
231-B8	9/27/2001	SVOCs	8	10	Naphthalene	49.1	16	
231-B8	9/27/2001	VOCs	8	10	Benzene	9.22	4	
231-B8	9/27/2001	VOCs	8	10	Chloroform	44.6	2	
231-B8	9/27/2001	VOCs	8	10	Tetrachloroethylene(PERC)	6.48	5	
5K-B4	10/1/2001	Metals	4	6	Arsenic	31.9	19	6.64
5K-B4	10/1/2001	Metals	4	6	Mercury	69	65	
5K-B4	10/1/2001	SVOCs	4	6	1,4-Dichlorobenzene	16.3	12	
5K-B4	10/1/2001	SVOCs	4	6	Naphthalene	99.6	16	
HF-B1	9/10/2001	Metals	8	10	Arsenic	30.9	19	1.345
HF-B1	9/10/2001	SVOCs	8	10	Benzo (a) Pyrene	0.982	0.2	
HF-B1	9/10/2001	SVOCs	8	10	Benzo (b) fluoranthene	2.01	2	
PCA-4	9/13/2001	Metals	4	6	Arsenic	27.5	19	1.7
WWT-1	8/23/2001	Metals	12	14	Arsenic	35.9	19	0.748
WWT-1	8/23/2001	Metals	12	14	Mercury	1920	65	
WWT-1	8/23/2001	PCBs	12	14	Aroclor 1260	2.72	1	
WWT-1	8/23/2001	SVOCs	12	14	1,4-Dichlorobenzene	33.8	12	
WWT-1	8/23/2001	SVOCs	12	14	Hexachlorobenzene	44	1	
WWT-1	8/23/2001	SVOCs	12	14	Naphthalene	54.5	16	
WWT-1	8/23/2001	VOCs	12	14	Methylene Chloride	245	87	
Phasell								
MW-11D	11/9/2006	SVOCs	12	14	Hexachlorobutadiene	37.9	25	5.7
MW-11D	11/9/2006	VOCs	12	14	1,2-Dibromoethane	0.11	0.04	
MW-11D	11/9/2006	VOCs	12	14	Chloroform	20	2	
MW-11D	11/9/2006	VOCs	12	14	DBCP	0.41	0.2	
MW-21D	11/16/2006	VOCs	13	13.7	1,2-Dibromoethane	0.046	0.04	0
MW-26S	10/26/2006	Metals	8	10	Arsenic	42.3	19	13.75
MW-26S	10/26/2006	SVOCs	8	10	Naphthalene	19.1	16	
MW-26S	10/26/2006	VOCs	8	10	1,2-Dibromoethane	0.042	0.04	
WWT-101	10/27/2006	Metals	12	14	Mercury	377	65	N/A - No VOCs

Note:
NRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standards
TIC - Tentatively Ientified Compound

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